

WHAT IS CLAIMED IS:

1. A method for operating a gas turbine engine including a combustor, the combustor including a combustion chamber and a centerline, said method comprising:

supplying fuel to the combustion chamber; and

directing compressed airflow through a unitary combustor dome assembly that includes a splashplate and a unitarily formed flare cone, such that at least a portion of the compressed airflow is channeled axially downstream through at least one cooling passage that is formed between the flare cone and the splashplate for cooling of the dome assembly.

2. A method in accordance with Claim 1 wherein directing compressed airflow through a combustor dome assembly further comprises directing airflow through at least one cooling passage for impingement cooling the flare cone.

3. A method in accordance with Claim 2 wherein directing airflow through at least one cooling passage further comprises channeling airflow from the at least one cooling passage into a gap defined between the splashplate and the flare cone, such that the airflow is discharged radially outward.

4. A method in accordance with Claim 1 wherein directing airflow through at least one cooling passage further comprises directing airflow through a plurality of circumferentially-spaced cooling passages such that the flare cone is substantially circumferentially impingement cooled.

5. A method in accordance with Claim 1 wherein said step of directing compressed airflow further comprises the step of reducing an operating temperature of the dome assembly flare cone to facilitate extending a useful life of the combustor.

6. A combustor for a gas turbine engine, said combustor comprising: a dome assembly comprising a unitary body comprising a splashplate, a flare cone, and

at least one cooling passage formed within said body for discharging cooling air for cooling at least a portion of said dome assembly.

7. A combustor in accordance with Claim 6 wherein said at least one cooling passage is positioned to receive cooling air therein for impingement cooling at least a portion of said flare cone.

8. A combustor in accordance with Claim 6 wherein said at least one cooling passage comprises a plurality of circumferentially-spaced cooling passages.

9. A combustor in accordance with Claim 6 wherein said at least one cooling passage facilitates extending a useful life of said combustor.

10. A combustor in accordance with Claim 6 wherein a gap is defined between said splashplate and said flare cone, said gap has a diameter that is larger than a diameter of said at least one cooling passage.

11. A combustor in accordance with Claim 6 wherein the combustor has a centerline axis, said gap defined such that cooling air is discharged radially outwardly therefrom.

12. A combustor in accordance with Claim 6 wherein said at least one cooling passage facilitates reducing a rate of oxidation formation within said dome assembly flare cone.

13. A gas turbine engine comprising a combustor comprising an annular dome assembly, said combustor dome assembly comprising an air swirler and a unitary body extending circumferentially around said air swirler, said unitary body comprising a splashplate, a flare cone, and at least one cooling passage formed therebetween, said at least one cooling passage for discharging cooling air therefrom in a direction that is substantially parallel a centerline of said dome assembly for cooling at least a portion of said combustor dome assembly.

14. A gas turbine engine in accordance with Claim 13 wherein said at least one cooling passage positioned to discharge cooling air therefrom for impingement cooling of said flare cone.

15. A gas turbine engine in accordance with Claim 14 wherein said at least one cooling passage comprises a plurality of cooling passages spaced circumferentially about said flare cone.

16. A gas turbine engine in accordance with Claim 14 wherein said at least one cooling passage is formed using an electro-discharge machining process.

17. A gas turbine engine in accordance with Claim 14 wherein at least a portion of said splashplate is spaced a radial distance from said flare cone such that a gap is defined therebetween, said gap comprises an entrance and an exit, said gap exit radially outward from said gap entrance.

18. A gas turbine engine in accordance with Claim 17 wherein the combustor has a centerline axis, said gap positioned such that cooling air is discharged radially outwardly therefrom

19. A gas turbine engine in accordance with Claim 14 wherein said combustor dome assembly at least one cooling passage facilitates reducing a rate of oxidation formation within said combustor dome assembly.

20. A gas turbine engine in accordance with Claim 14 wherein said combustor dome assembly at least one cooling passage facilitates extending a useful life of said combustor.